September 1971 Brief 71-10347

NASA TECH BRIEF

Goddard Space Flight Center

Diode Matrix Reduces Computer Memory Power Requirements

The problem:

To minimize the current through unblown fuse elements in the memory read cycles of high density computer memories using fusable memory elements. Such elements require only a minimal amount of power and elemental cell size.

The solution:

A bidirectional MOS driver, integrated with a diode matrix, which reduces the fuse read current to only that of junction leakage and transient MOS gate charging current.

How it's done:

When the data line is positive in the "write" mode, current in the addressed cell flows as shown in Figure 1. No current, except junction leakage current, flows in the unaddressed cells. During the "read" mode only, the current required to drive a MOS gate flows through the unfused branch. The diode matrix array may be used with oxide breakthrough structures shown in Figure 2, with the addition of an isolation resistor to prevent undesired charging of the memory element in the "off" condition.

Notes:

1. Related work on low current fusible links and oxide breakthrough devices is reported in NASA CR-106493 (N69-41187), "Read Only Memories," available through the National Technical Information Service, Springfield, Virginia, 22151.
2. Requests for further information may be directed to:

   Technology Utilization Officer
   Goddard Space Flight Center
   Greenbelt, Maryland 20771
   Reference: B71-10347

Patent status:

No patent action is contemplated by NASA.

Source: J. R. Cricchi of
Westinghouse Electric Corp.
under contract to
Goddard Space Flight Center
(GSC-10994)

(continued overleaf)

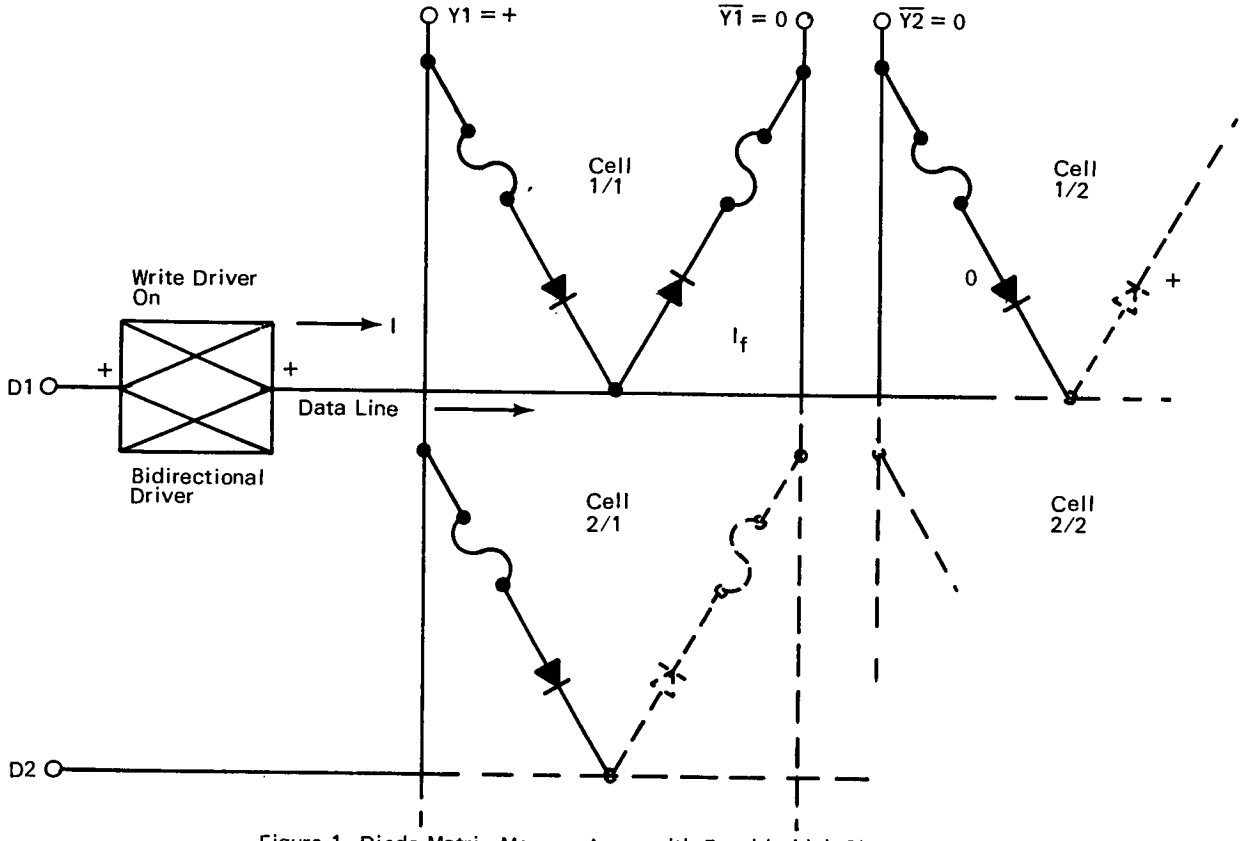

Figure 1. Diode Matrix Memory Array with Fusable Link Elements

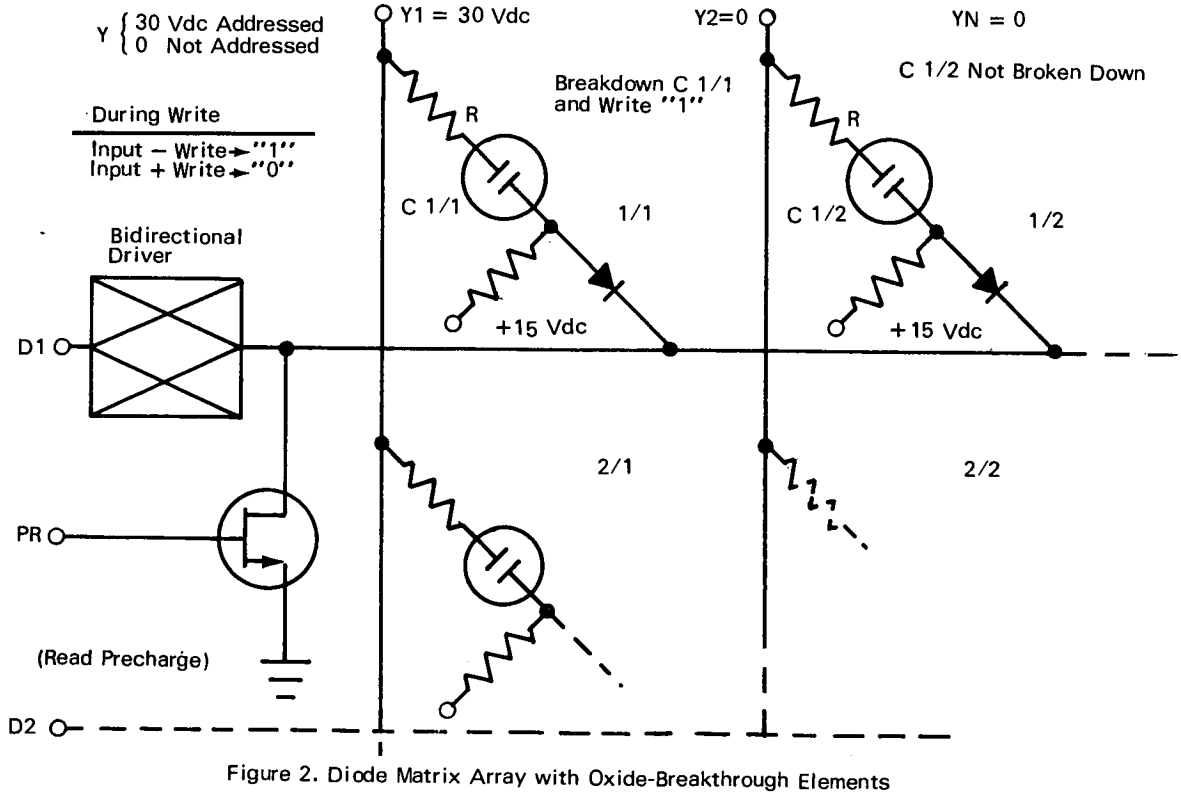

Figure 2. Diode Matrix Array with Oxide-Breakthrough Elements